

Module 2 - To Err is Human

ME3023 - Measurements in Mechanical Systems

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Topic 3 - Repeatability and Testing

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- Instrument Repeatability
- Conditions for Repeatability
- Reproducibility and Instrument Uncertainty

Instrument Repeatability

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provides a measure of the instrument **repeatability**. Specific claims of **repeatability** are based on multiple calibration tests (replication) performed within a given lab on the particular unit.”

$$\%u_{R_{max}} = \frac{2s_x}{r_0} \times 100$$

Text: Theory and Design of Mech. Meas.

Conditions for Repeatability

The following conditions need to be fulfilled in the establishment of repeatability:

- the same experimental _____
- the same _____
- the same measuring instrument, used under _____
- the same location
- repetition over a short _____
- same objectives

Text: Wikipedia(NIST)

Reproducibility and Instrument Uncertainty

“The term _____, when reported in instrument specifications, refers to the closeness of agreement in results obtained from duplicate tests carried out under similar conditions of measurement ...

... The term **instrument precision**, when reported in instrument specifications, refers to a random _____ based on the results of separate repeatability tests.”

Text: Theory and Design of Mech. Meas.